# THE MINERAL INDUSTRIES OF EQUATORIAL GUINEA AND SAO TOME AND PRINCIPE

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## EQUATORIAL GUINEA

In 2003, the Republic of Equatorial Guinea had an estimated population of about 523,000. Its total area of 28,051 square kilometers comprised a number of islands and islets, which included Bioko in the Gulf of Guinea, and the Rio Muni enclave on the African mainland. The gross domestic product (GDP) of Equatorial Guinea was estimated to be about $3.0 billion. Petroleum accounted for more than 85% of GDP and more than 80% of Government revenue. Oil revenues included the Government's share of profits from oil production joint ventures, royalties, corporate income tax on oil companies, and sales taxes on oil contractors (International Monetary Fund, 2003, p. 25, 35; 2004§[1]; U.S. Central Intelligence Agency, 2004§).

Mineral resources were the property of the state. Natural gas and oil exploration and production contracts were administered by the Ministry of Mines and Energy, which also promoted the development of Rio Muni's mineral occurrences. Compañia Nacional de Petróleos de Guinea Ecuatorial (GEPetrol), which was the national oil company, managed the Government's interest in crude oil production operations and promoted other investment opportunities in the nation's petroleum sector. Most of the produced oil was exported and much of the produced natural gas was reinjected after liquids were stripped from the gas stream. In addition to liquefied petroleum gases, methanol, natural gas, and oil, some crude construction materials (clay, gravel, sand, and volcanic rock) and gold were produced. The nation's other mineral commodity requirements were met through imports.

Hydrocarbon output has increased significantly since Walter International, Inc. began condensate production from the Alba Field in 1991. The value of petroleum exports exceeded $1 billion per year in 2000 and $2 billion per year in 2002 (International Monetary Fund, 2004§). Equatorial Guinean petroleum exports to the United States were valued at $773.6 million in 2003, compared with $486 million in 2002, $355.1 million in 2001, and $152.5 million in 2000. Equatorial Guinean chemical exports (primarily methanol) to the United States increased to $136.9 million in 2003 compared with $71 million in 2002, $37 million in 2001, and zero dollars in 2000 (U.S. International Trade Commission, 2003§, 2004§).

### Commodity Review

Offshore oil and natural gas production dominated the country's mineral industry and, in 2003, Equatorial Guinea ranked seventh (based on production volume) of all African crude oil producers (BP p.l.c., 2004§). On the Alba Field, Marathon Equatorial Guinea Production Ltd. (a subsidiary of Marathon Oil Corp.), Noble Energy Equatorial Guinea Ltd. (a subsidiary of Noble Energy, Inc.), and GEPetrol successfully drilled the Deep Luba well and discovered an additional natural-gas-laden sand package that was about 330 meters deeper than the producing field's reservoirs (Noble Energy, Inc., 2003). The joint venture also increased condensate production to 30,000 barrels per day (bbl/d) from 18,000 bbl/d, which was attributed to the Phase 2A expansion project of the Alba Field. The Government approved the proposal by Marathon and GEPetrol to build a more-than-3.4-million-metric-ton-per-year-capacity liquefied natural gas (LNG) plant at Punta Europa (Ministry of Mines and Energy, 2003; Clark, 2004).

The joint venture of Mobil Equatorial Guinea Inc., which was a subsidiary of Exxon Mobil Corp. (ExxonMobil) (71.25% participating interest); Ocean Equatorial Guinea Corp., which was a subsidiary of Devon Energy Corp. (23.75%); and the Government (5%) continued the development of block B. Initial production from the Zafiro Southern Expansion Area on block B began in July, which was months ahead of schedule. Several wells were connected to processing facilities on the floating, production, storage, and offloading vessel (FPSO) Serpentina, which was designed to process 1.84 million cubic meters per day of natural gas, 150,000 bbl/d of water, and 110,000 bbl/d of crude oil; and to store 1.9 million barrels of oil. Combined with the 110,000-bbl/d-crude-oil-capacity FPSO Zafiro Producer and the 80,000-bbl/d-crude-oil-capacity Jade platform, the FPSO Serpentina increased the Zafiro Field's production capacity to 300,000 bbl/d (DeLuca, 2003).

On block D, Marathon and the SK Corp. drilled a natural gas discovery well on the Bococo Prospect. Exploration wells drilled on block F by the partnership of Energy Africa Ltd. and Triton Equatorial Guinea, Inc. [a subsidiary of Amerada Hess Corp. (AHC)] were unsuccessful, but about 21 kilometers south of the Ceiba Field on block G, the G-13-2 well confirmed the reservoir discovered in the G-13 well. Additional wells (G-13-3, Okume-5, and appraisal wells in shallow water near the Elon prospect) were drilled in 2003 with mixed results. The partnership had a three-dimensional seismic survey conducted across part of block G. Production problems with the partnership's Ceiba Field continued with the failure of a gravel pack on one well, and failure of a subsea pump on another. The water injection program that had been initiated to maintain reservoir pressure in the Ceiba Field, however, was reported to be successful—the water injection rate was increased by nearly 300% in 2003 and AHC anticipated increased average daily petroleum production from the field in 2004. Development plans for the Elon, Okume, and Oveng prospects on block G were revised and

[1] References that include a section mark (§) are found in the Internet References Cited sections.

resubmitted to the Government; initial production was expected to begin in 2005 or 2006 (Africa Energy Intelligence, 2003; Energy Africa Ltd., 2003; Petroleum Economist, 2003; Amerada Hess Corp., 2004. p. 10; Energy Africa Ltd., 2003§).

The Atlas Group (45% working interest), Roc Oil Co. Ltd. (35%), and Sasol Petroleum International Ltd. (20%) planned to drill an exploration well on block H in 2004. In 2003, Nexen Inc. of Canada and Repsol YPF S.A. of Spain each acquired a 25% participating interest in block K (Corisco Deep) from Vanco Energy Co., which retained a 50% interest in the production-sharing contract. Nexen, as the new block operator, planned to reprocess existing seismic surveys of the block, which was southwest of the Ceiba Field, and proposed to drill one or two exploration wells in 2004.

On block L, Energy Africa Ltd. of South Africa acquired a 20% interest from the joint venture of Chevron Equatorial Guinea Ltd. (which retained a 45% participating interest), Triton (25%), and Sasol (10%); the joint venture drilled the Ballena-1 exploration well in 2003 with only minor oil shows. On block O, the negotiations continued between Glencore Exploration Ltd. (a subsidiary of Glencore International AG) and GEPetrol. Ocean Equatorial Guinea, Petronas Carigali Equatorial Guinea Ltd., Atlas Petroleum (International) Ltd., and DNO ASA signed a production-sharing agreement with GEPetrol on block P where the joint venture expected to drill one or two exploration wells in 2004 or 2005.

## Outlook

Focused, imaginative, innovative, and persistent exploration has transformed the Equatorial Guinean region from a marginal deep-water natural gas province to an attractive oil prospect. Although the high rate of exploration successes of the last several years appears to have declined, explorationist's enthusiasm for the region's upside potential has not dimmed. Drilling of numerous wildcat wells has been proposed for 2004 and 2005, and the Government continued to negotiate production-sharing agreements on additional concession blocks. The planned LNG plant and the production and export of commodities associated with natural gas, such as liquefied petroleum gas and methanol, have made the development of the necessary infrastructure to capture natural gas feasible, despite the very limited local market. The high level of oilfield activity could result in the development of a small cement plant or could increase demand for cement from West African plants.

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## Major Source of Information

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### Major Publication

Ministerio de Minas y Energia, 2002, Hydrocarbons and Mining in Equatorial Guinea: Malabo, Ministerio de Minas y Energia, 21 p.

## SAO TOME AND PRINCIPE

Situated offshore Gabon between Equatorial Guinea's Annobon and Bioko islands, the Democratic Republic of Sao Tome and Principe consists of the islands of Sao Tome and Principe and several islets in the Gulf of Guinea that encompass a total area of 1,001 square kilometers. In 2003, the nominal GDP of Sao Tome and Principe was estimated to be $59 million, and the population was estimated to be about 176,000 (U.S. Central Intelligence Agency, 2003§; International Monetary Fund, 2004§).

In 2003, an abortive bloodless military coup and the negotiations for the 10 deepwater oil blocks tendered by the Nigeria-São Tomé and Príncipe Joint Development Authority dominated the news about Sao Tome and Principe. The mineral industry was administered by the Ministry of Public Works, Infrastructure, Natural Resources, and Environment. Some clay and volcanic rock were produced; however, all other mineral product requirements were imported.

The Nigeria-São Tomé and Príncipe Joint Development Authority placed nine blocks in the joint development zone (JDZ) up for bid. Each successful bid on a JDZ block would require a signature fee; $30 million was designated as the minimum offer. Each block also was subject to post-bid acquisition of partial working interest by Environmental Remediation Holding Corp. of the United States (which was doing business as Chrome Energy Corp.) and ExxonMobil. Both companies had been awarded rights to the area by the Government of Sao Tome and Principe prior to the formation of the JDZ.

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TABLE 1
EQUATORIAL GUINEA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES [1, 2]

(Thousand 42-gallon barrels unless otherwise specified)

| Commodity[3] | | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Crude oil and condensate | | 37,628 [r, 4] | 43,029 [r, 4] | 74,855 [r, 4] | 90,144 [r, 4] | 95,000 |
| Gold | kilograms | 500 | 500 | 500 | 500 | 500 |
| Liquefied petroleum gases | | 800 | 800 | 800 | 700 | 700 |
| Methanol | metric tons | -- | -- | 600,000 | 719,000 | 825,000 |
| Natural gas[5] | million cubic meters | 83 | 98 | 790 | 1,050 | 1,220 |

[r]Revised. -- Zero.
[1]Includes data available through July 8, 2004.
[2]Estimated data are rounded to no more than three significant digits.
[3]In addition to the commodities listed, Equatorial Guinea presumably produced a variety of crude construction materials (clay, gravel, and sand).
[4]Reported.
[5]Marketed gas estimate.